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NW Fisheries  
Science Center

# A Little More Detail: Data and Key Goals for the Review

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# Outline

- Data we use
- Data matrices – an overview
- Key Goals for this Review



# Difference Between Dependent and Independent Surveys?

## Fishery-Dependent index of stock abundance

- Catch rates by fishermen recorded in their logbooks should go up and down with fish abundance
- But fishermen are businessmen looking to be successful
  - Adjust fishing methods
  - Adjust fishing locations
- So, difficult to standardize as an index of stock size

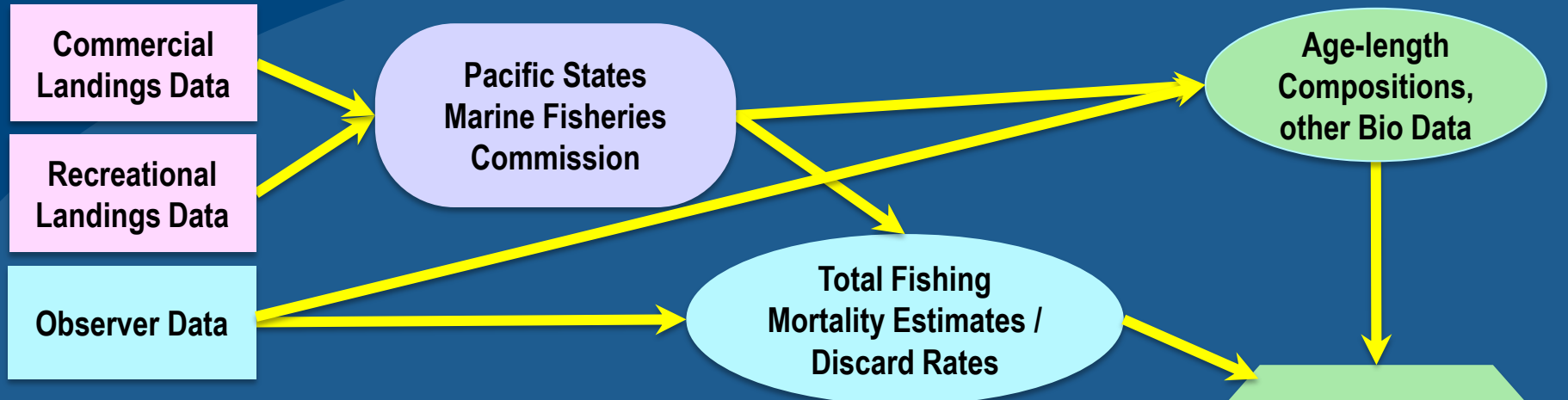
## Fishery-Independent surveys of fish abundance

- Cover range of the stock, even areas with lower abundance
- Select sample locations with spatial statistical plan
- Use highly standardized sampling methods
- With advanced technology (acoustics, optical, robotics, smart tags) can achieve higher degrees of calibration, potentially absolute calibration

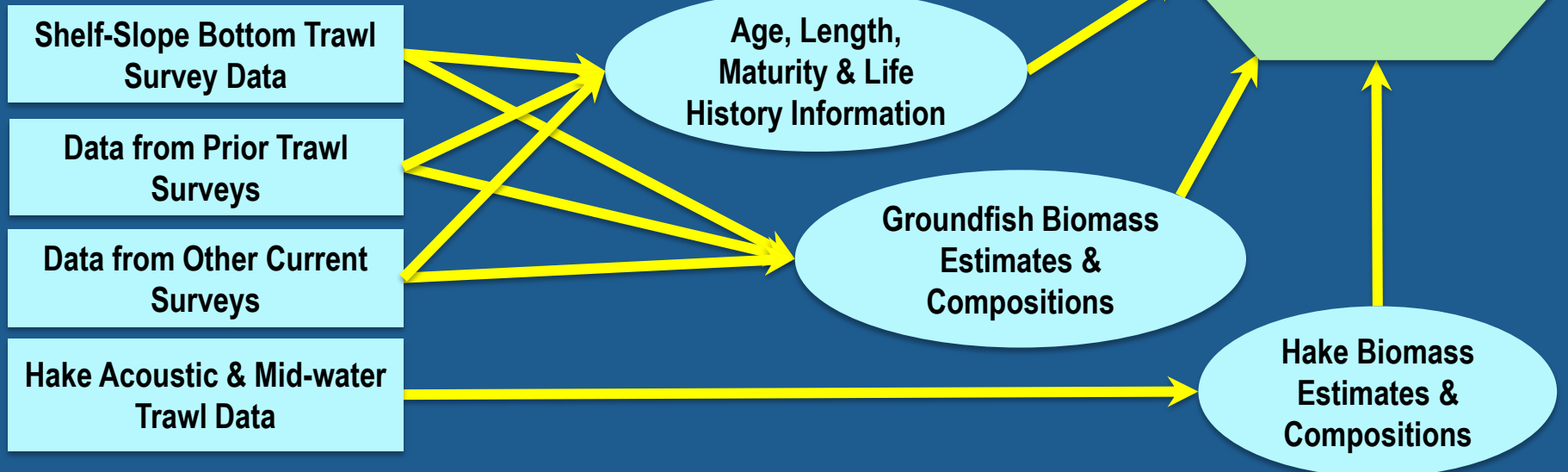


# Fishery Data Flows

## Fishery Dependent Data

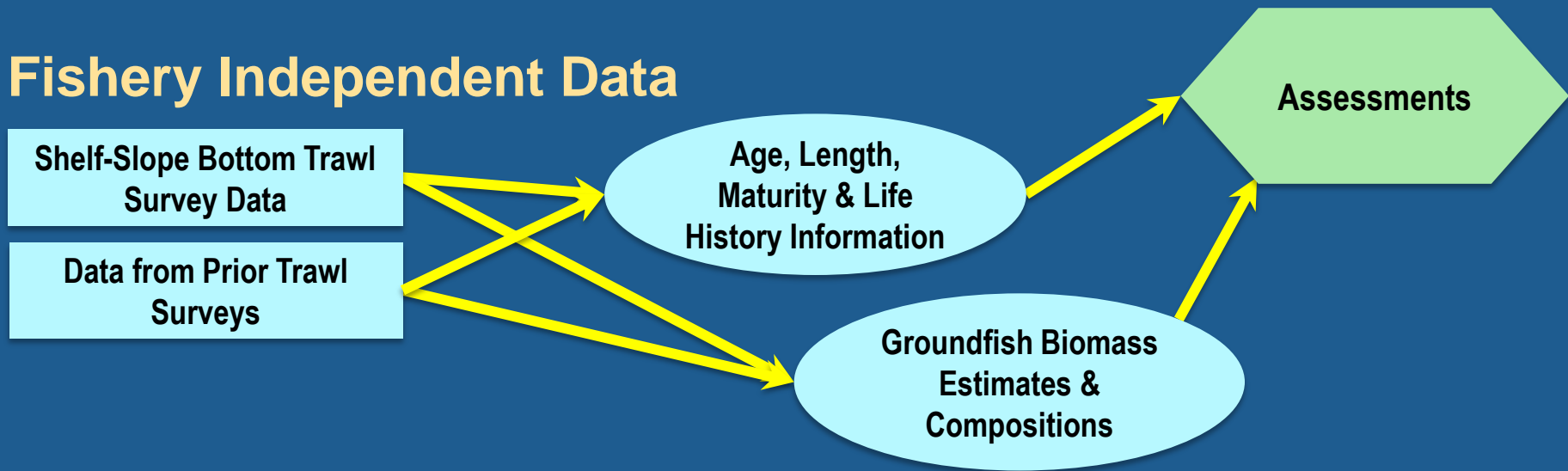


## Fishery Independent Data



# Fishery Data Flows

## Fishery Independent Data



# Groundfish Bottom Trawl Survey



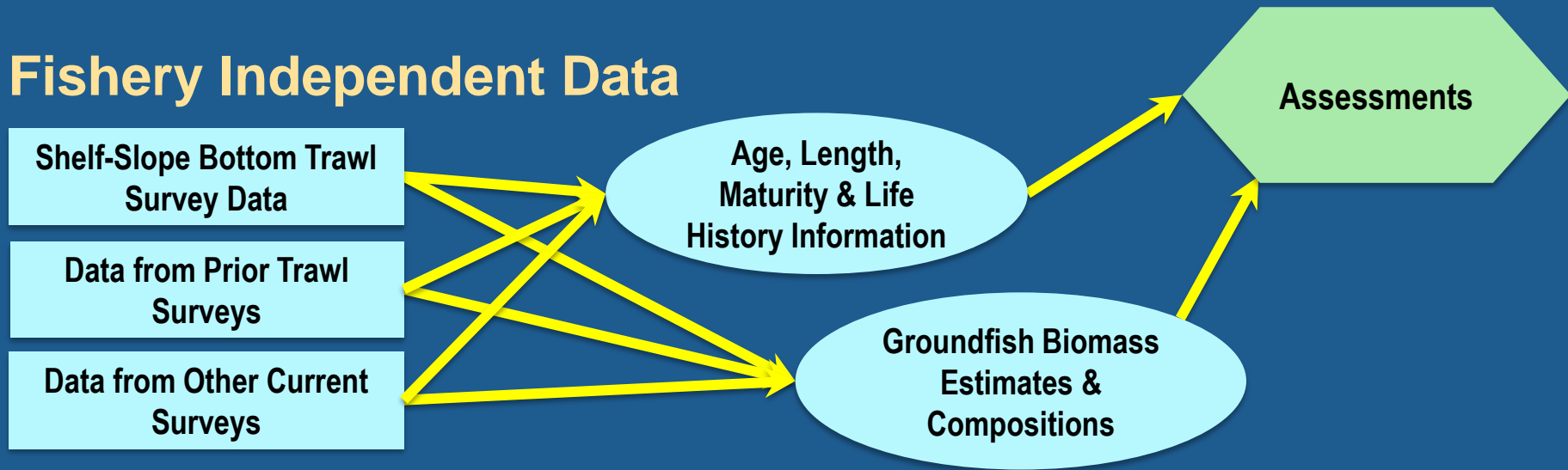
## No Longer Conducted

- AFSC Triennial Survey
- AFSC Slope Survey
- NWFSC Slope Survey



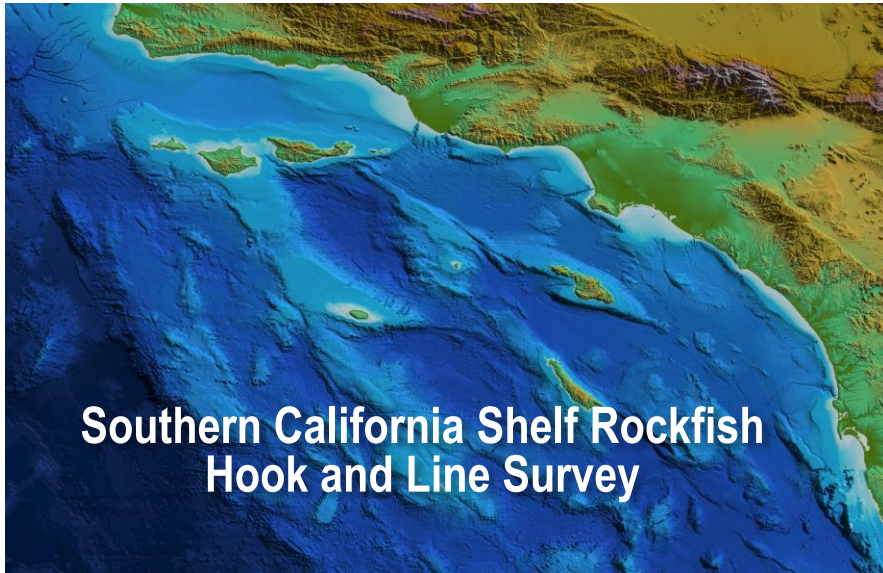
# Fishery Data Flows

## Fishery Independent Data

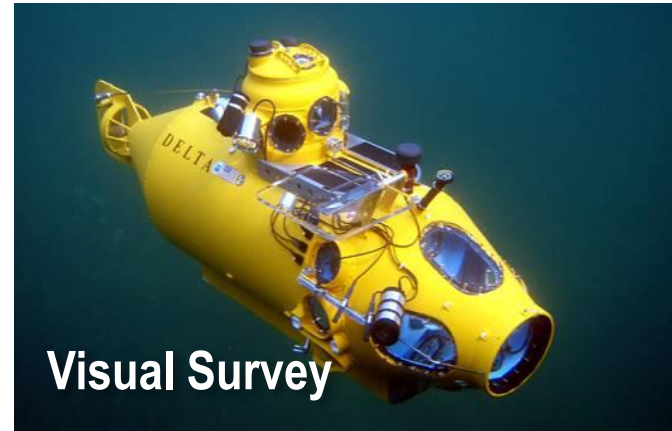




# Complementary Surveys



**Southern California Shelf Rockfish  
Hook and Line Survey**



**Visual Survey**



**Rockfish recruitment and  
ecosystem assessment  
survey**

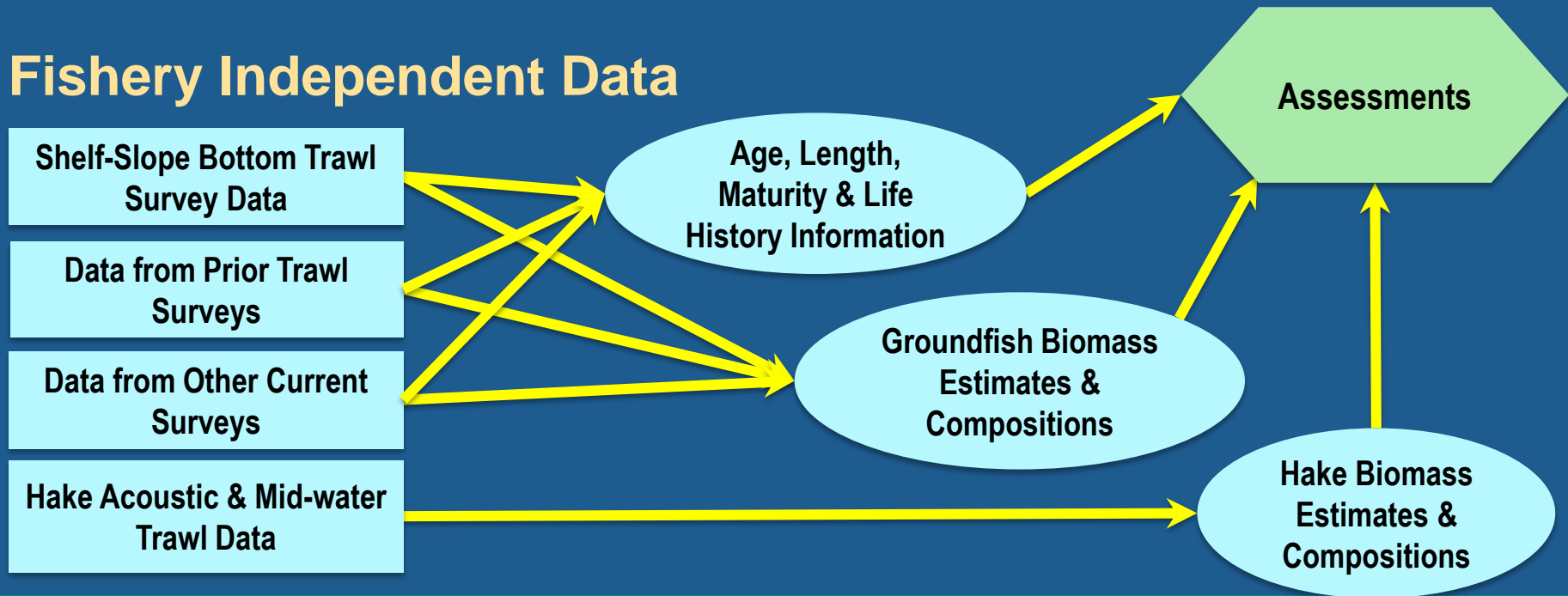
Aspirational surveys.....



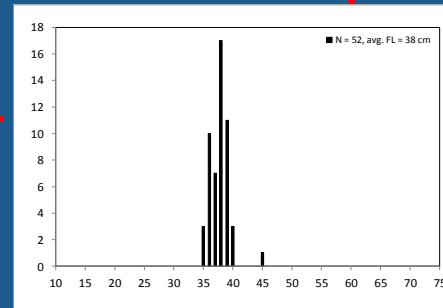
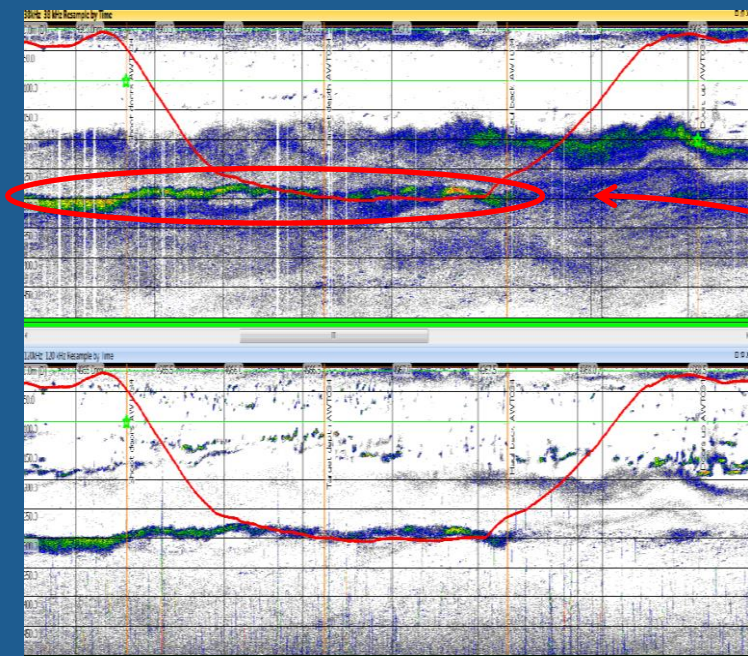
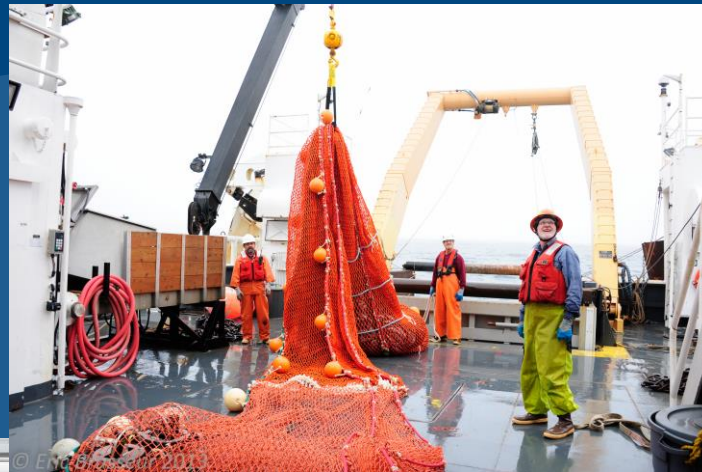
# Fishery Data Flows

## Fishery Dependent Data

## Fishery Independent Data



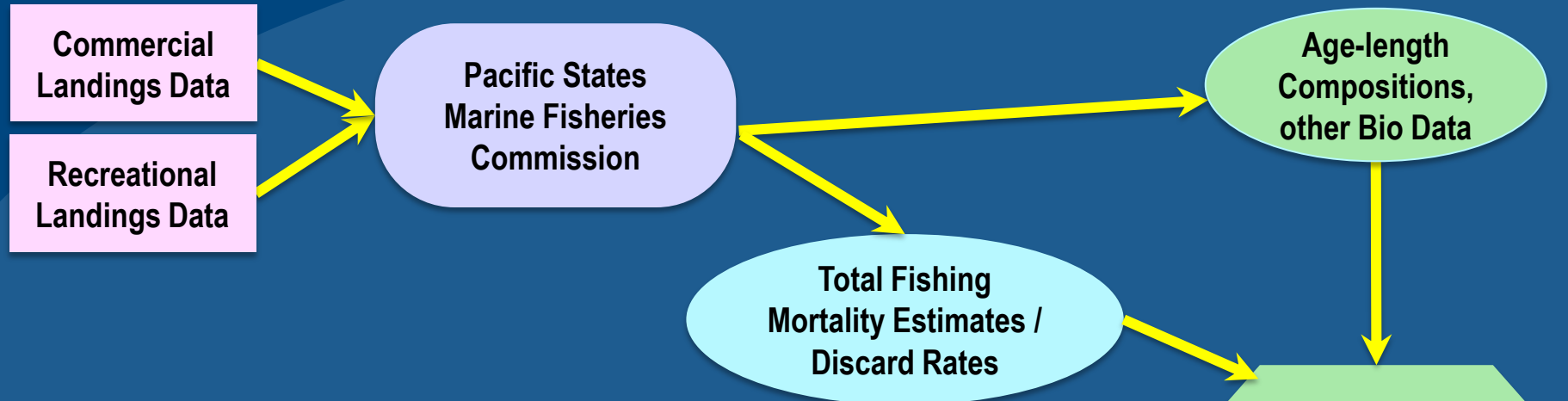
# Integrated Acoustic Trawl Survey



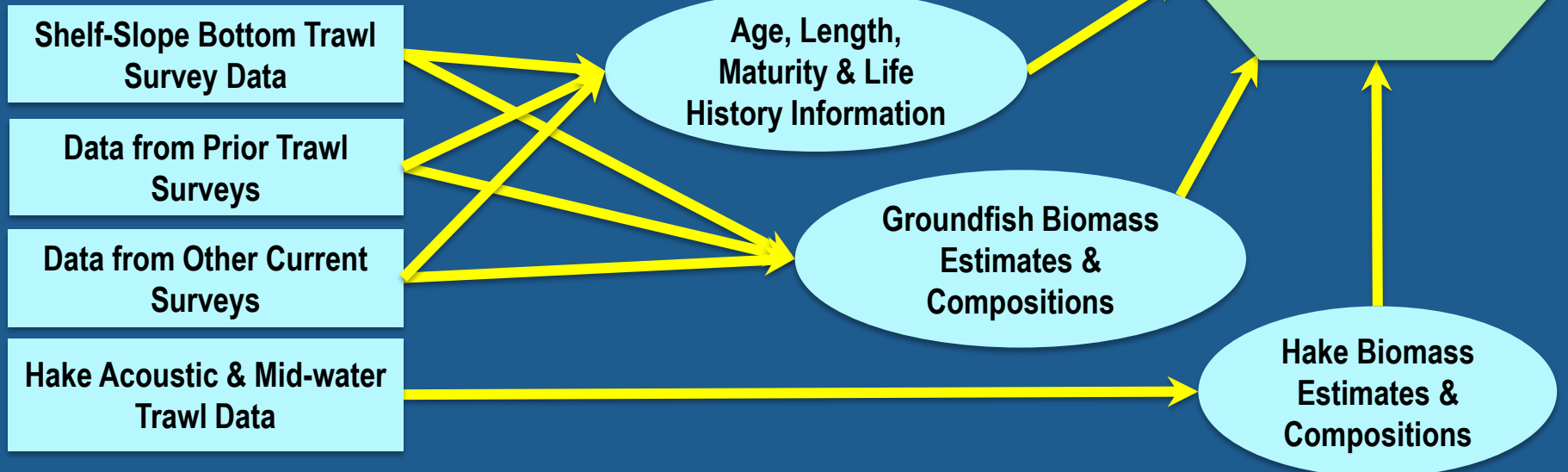
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# Fishery Data Flows

## Fishery Dependent Data



## Fishery Independent Data



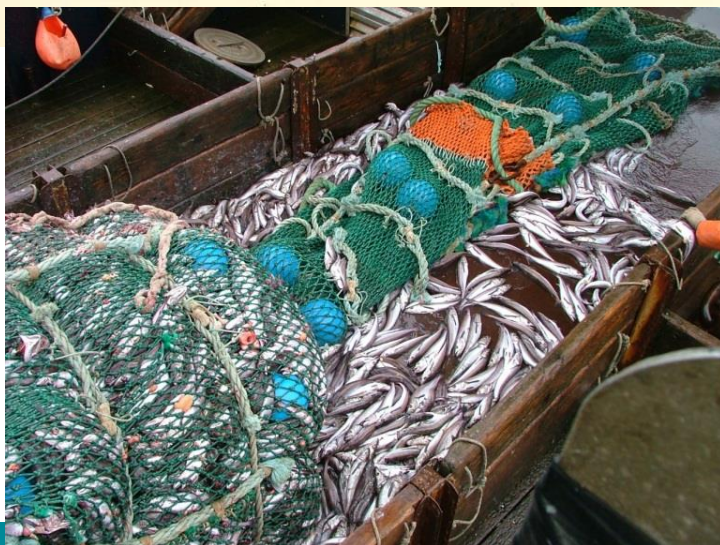


# Commercial and Recreational Catch

WASHINGTON – OREGON – CALIFORNIA

## TRAWL LOGBOOK

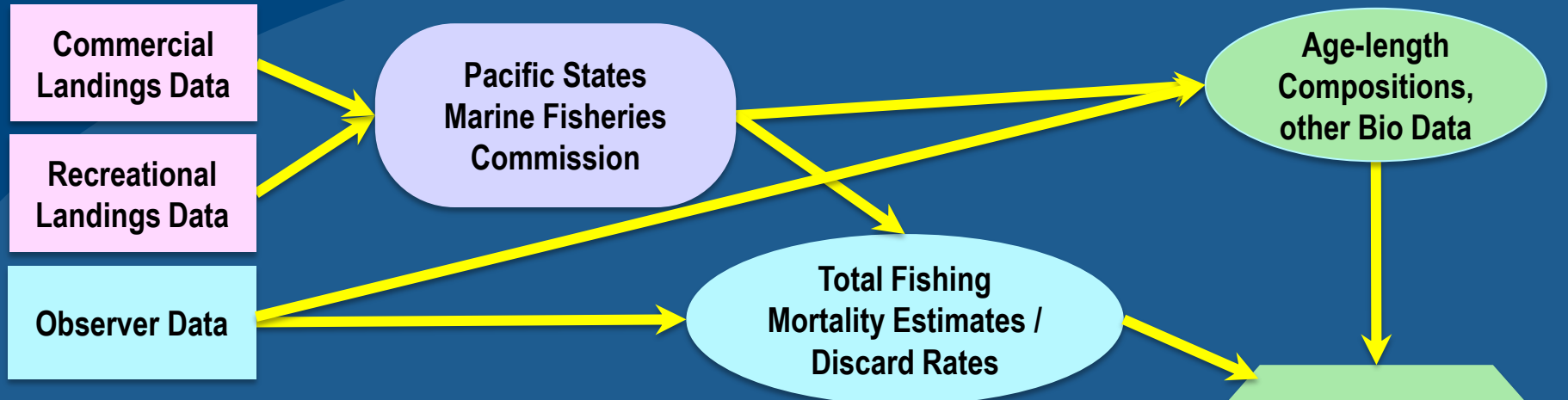
Nº 4577



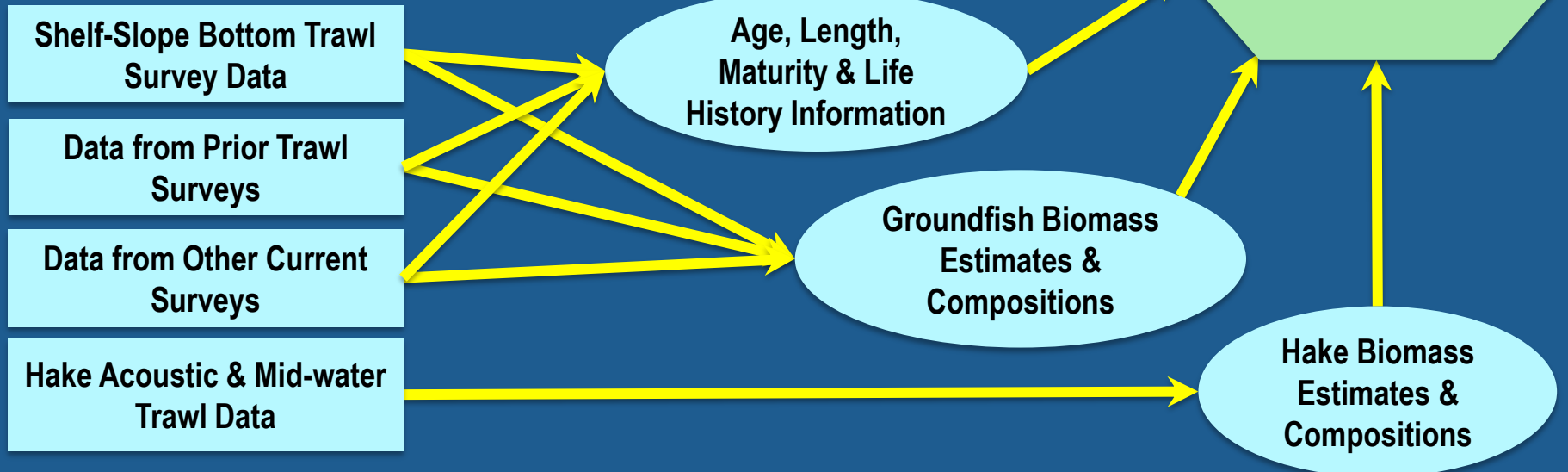
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# Fishery Data Flows

## Fishery Dependent Data



## Fishery Independent Data



# Observer Data -- Discards





# Data Used in Assessments

| Tab Label                     | Table Title  |
|-------------------------------|--|
| 1. F-ind sources              | 1. Fishery-Independent Data used in Pacific Coast Groundfish Assessments   |
| 2. F-Dep sources              | 2. Fishery-Dependent Data used in Pacific Coast Groundfish Assessments   |
| 3. F-ind adequacy             | 3. Adequacy of Fishery-Independent Data, for use in Pacific Coast Groundfish Assessments   |
| 4. F-dep adequacy             | 4. Adequacy of Fishery-Dependent Data, for use in Pacific Coast Groundfish Assessments   |
| 5. Bio-samp NWC Tsurv sum     | 5. Summary of Species Occurrence and Biological Sampling in the NWFSC Shelf/Slope Bottom Trawl Survey, 2003-2012                 |
| 6. Bio-samp Tsurv old sum     | 6. Summary of Species Occurrence and Biological Sampling in the Discontinued Pacific Coast Bottom Trawl Surveys                  |
| 7. Bio-samp Hlsurv            | 7. Summary of Biological Sampling in the NWFSCS Southern California Bight Hook-and-Line Survey                                   |
| 8. St Sp-comp samp sum        | 8. Summary of Landing ("Market") Category Species-Composition Sampling in California, Oregon, and Washington, 2002-2011          |
| 9. St Bio-samp sum            | 9. Summary of Biological Sampling of Commercial and Recreational Landings in Washington, Oregon, and California, 2002-2011       |
| 10. WCGOP Bio-samp sum        | 10. Summary of Biological Sampling of Shoreside-Fishery Discards by WCGOP Observers, 2003-2011                                   |
| 11. ASHOP Bio-samp sum        | 11. Summary of Biological Sampling of At-sea-Fishery Discards by ASHOP Observers, 2002-2011                                      |
| 12. Bio-samp detail NWC Tsurv | 12. Annual Species Occurrence and Biological Sampling in the NWFSC Shelf/Slope Bottom Trawl Survey, 2003-2012                    |
| 13. Bio-samp detail NWC Slope | 13. Annual Species Occurrence and Biological Sampling in the NWFSC Slope Bottom Trawl Survey, 1998-2002                          |
| 14. Bio-samp detail AFC Slope | 14. Annual Species Occurrence and Biological Sampling in the AFSC Slope Bottom Trawl Survey, 1996-2001                           |
| 15. Bio-samp detail Triennial | 15. Annual Species Occurrence and Biological Sampling in the AFSC/NWFSC Triennial Bottom Trawl Survey, 1980-2004                 |
| 16. FT landings               | 16. Annual commercial tonnage landed in specific groundfish landing ("market") categories, by state, 2002-2011                   |
| 17. Sp-comp detail WOC        | 17. Annual Sampling of the Species-Composition of Landing ("Market") Categories in California, Oregon, and Washington, 2002-2011 |
| 18. Bio-samp detail CA        | 18. Annual Biological Sampling of Commercial and Recreational Landings in California, 2002-2011                                  |
| 19. Bio-samp detail OR        | 19. Annual Biological Sampling of Commercial and Recreational Landings in Oregon, 2002-2011                                      |
| 20. Bio-samp detail WA        | 20. Annual Biological Sampling of Commercial and Recreational Landings in Washington, 2002-2011                                  |
| 21. WCGOP Bio-samp detail     | 21. Annual Collection of Biological Samples from Shoreside-Fishery Discards by WCGOP Observers, 2003-2011                        |



# Data Used in Assessments

## Fishery-Independent

| Assessment Type<br>Assessments | Last<br>Year<br>Assessed | Current data collection programs |                     |                          |                               |                           |                    |                             | Dead data collection programs |                          |                           |                            |
|--------------------------------|--------------------------|----------------------------------|---------------------|--------------------------|-------------------------------|---------------------------|--------------------|-----------------------------|-------------------------------|--------------------------|---------------------------|----------------------------|
|                                |                          | Combo<br>survey<br>I-L-A-R       | Acoustic<br>I-L-A-R | H&L<br>survey<br>I-L-A-R | Juvenile<br>Survey<br>I-L-A-R | IPHC<br>survey<br>I-L-A-R | CalCOFI<br>I-L-A-R | Cowcod<br>Visual<br>I-L-A-R | AFSC<br>Triennial<br>I-L-A-R  | AFSC<br>Slope<br>I-L-A-R | NWFSC<br>Slope<br>I-L-A-R | "POP"<br>Survey<br>I-L-A-R |
| <b>Tier 1</b>                  |                          |                                  |                     |                          |                               |                           |                    |                             |                               |                          |                           |                            |
| Aurora                         | 2013                     | I-L-A-R                          |                     |                          |                               |                           |                    |                             | I-L                           | I-L                      | I                         |                            |
| Black rockfish                 | 2007                     |                                  |                     |                          | I                             |                           |                    |                             |                               |                          |                           |                            |
| Bocaccio rockfish              | 2011                     | I-L                              |                     | I-L                      | I                             |                           | I                  |                             | I-L                           |                          |                           |                            |
| Cabazon                        | 2009                     |                                  |                     |                          |                               |                           |                    |                             |                               |                          |                           |                            |
| Cal. Scorpionfish              | 2005                     |                                  |                     |                          |                               |                           | I                  |                             |                               |                          |                           |                            |
| Canary rockfish                | 2011                     | I-L-A                            |                     |                          | I                             |                           |                    |                             | I-L-A                         |                          |                           |                            |
| Chilipepper rockfish           | 2007                     | I-L                              |                     |                          | I                             |                           |                    |                             | I-L                           |                          |                           |                            |
| Darkblotched rockfish          | 2013                     | I-L-A-R                          |                     |                          |                               |                           |                    |                             | I-L-A                         | I-L-A                    | I-L-A                     |                            |
| Dover sole                     | 2011                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L                           | I-L                      | I-L-A                     |                            |
| Gopher rockfish                | 2005                     |                                  |                     |                          |                               |                           |                    |                             |                               |                          |                           |                            |
| Kelp greenling                 | 2005                     |                                  |                     |                          |                               |                           |                    |                             |                               |                          |                           |                            |
| Lingcod                        | 2009                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L-A                         |                          |                           |                            |
| Longnose skate                 | 2007                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L                           | I-L                      | I-L                       |                            |
| Pacific hake                   | 2013                     |                                  | I-A                 |                          |                               |                           |                    |                             |                               |                          |                           |                            |
| Pacific ocean perch            | 2011                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L-A                         | I-L-A                    | I-L-A                     | I-L-A                      |
| Pacific sanddab                | 2013                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L                           |                          |                           |                            |
| Petrale sole                   | 2013                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L                           |                          |                           |                            |
| Rougheye                       | 2013                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L                           | I-L                      | I-L                       |                            |
| Sablefish                      | 2011                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L-A                         | I-L-A                    | I-L-A                     |                            |
| Shortspine thornyhead          | 2013                     | I-L                              |                     |                          |                               |                           |                    |                             | I-L                           | I-L                      | I-L                       |                            |
| Spiny Dogfish                  | 2011                     | I-L                              |                     |                          |                               | I                         |                    |                             | I-L                           | I-L                      | I-L                       |                            |
| Splitnose rockfish             | 2009                     | I-L-A                            |                     |                          |                               |                           |                    |                             | I-L-A                         | I-L-A-R                  | I-L                       |                            |
| Widow rockfish                 | 2011                     | I-L-A                            |                     |                          | I                             |                           |                    |                             | I-L                           |                          |                           |                            |



# Data Used in Assessments

## Data Adequacy

| Assessment Tier<br>Species | Last<br>Year<br>Assessed | Current data collection programs |          |               |                    |                |         |                  | Dead data collection programs |               |                |                 |
|----------------------------|--------------------------|----------------------------------|----------|---------------|--------------------|----------------|---------|------------------|-------------------------------|---------------|----------------|-----------------|
|                            |                          | NWC Twl<br>Survey                | Acoustic | H&L<br>Survey | Juvenile<br>Survey | IPHC<br>Survey | CalCOFI | Cowcod<br>Visual | AFSC<br>Triennial             | AFSC<br>Slope | NWFSC<br>Slope | "POP"<br>Survey |
| <b>Tier 1</b>              |                          |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Aurora rockfish            | 2013                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Black rockfish             | 2007                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Bocaccio rockfish          | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Cabazon                    | 2009                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Cal. Scorpionfish          | 2005                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Canary rockfish            | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Chilipepper rockfish       | 2007                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Darkblotched rockfish      | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Dover sole                 | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Gopher rockfish            | 2005                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Kelp greenling             | 2005                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Lingcod                    | 2009                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Longnose skate             | 2007                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Pacific hake               | 2013                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Pacific ocean perch        | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Petrale sole               | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Rougheye rockfish          | 2013                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Sablefish                  | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Shortspine thornyhead      | 2005                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Spiny Dogfish              | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Splitnose rockfish         | 2009                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |
| Widow rockfish             | 2011                     |                                  |          |               |                    |                |         |                  |                               |               |                |                 |



# Key Areas of Interest

- Approaches for evaluating impact of changing survey frequency
  - Acoustic-trawl for hake
  - Groundfish bottom trawl
- Suite of surveys -- Most fruitful areas for expansion, reduction or change
- Untrawlable habitats – approaches for turning emerging technologies into surveys
- Data management – improving storage, manipulation, delivery

